

Remarks**I. Restriction Requirement**

The Restriction Requirement previously issued against this application was made final. Accordingly, solely to place this application in condition for allowance, applicants have canceled withdrawn claims 28-30 without prejudice. Applicants reserve the right to file one or more divisional applications to pursue claims having features of canceled claims 28-30.

II. Double Patenting

Claims 1-27 and 31-45 are rejected under the judiciously created doctrine of obviousness-type double patenting as allegedly being obvious over claims issued with assignee's U.S. Patent No. 6,672,502. Applicants shall file a terminal disclaimer to address this provisional obviousness-type double patenting rejection upon receiving confirmation that the present application is otherwise in condition for allowance.

III. Anticipation Rejection over Paul 1

Claims 1-2, 4, 14-15, 23, 28, 31-32, 39, 40, 43 and 45 are rejected as allegedly being anticipated by a document "Intermetallic Microlaminations for High-Temperature Microreactors," herein after Paul 1. Paul 1 does not constitute prior art to this application, as discussed further below. Moreover, applicants have amended independent claim 1 to include additional features that are not taught by Paul 1. Applicants therefore traverse this rejection and request that it be withdrawn.

The Office action refers to Paul 1 as a "publication." However, this document was never "published." The undersigned has confirmed that this document was not published by consultation with the lead author, Professor Paul, at Oregon State University.

Moreover, an examination of the document itself establishes that it was simply a draft. For example, section 3, entitled "Results," includes the statement that this section "(Needs to be completed)." Documents published by technical journals do not include such statements. Moreover, page 10 of the document also includes Sections 4 and 5, entitled "Discussion" and "Conclusions," respectively. There is no information provided in these sections. Again,

documents published by technical journals do not include such statements. Read in combination, sections 3-5 of Paul 1 clearly establish that the document was a draft that was not intended for, nor was it, "published" as required by 35 U.S.C. § 102(b).

Instead, the document was most likely inadvertently included with applicants' information disclosure statement. Applicants' information disclosure statement clearly states that "[t]he filing of this IDS shall not be construed to be an admission that the information cited in the statement is, or is considered to be, prior art or otherwise material to patentability as defined in 37 C.F.R. § 1.56."

Since Paul 1 was not published, and because applicants have amended claim 1 to include additional features not taught or suggested by Paul 1, applicants request that the rejection of claims 1-2, 4, 14-15, 23, 28, 31-32, 39, 40, 43 and 45 as allegedly being anticipated by Paul 1 be withdrawn.

IV. Anticipation Rejection over Paul 2

Claims 31-37, 39-40 and 43-45 are rejected as allegedly being anticipated by Paul 2. Applicants traverse this rejection and request that it be withdrawn.

Applicants have amended independent claim 31 to state that "at least one lamina of the plurality of stacked and registered laminae comprises at least a first metal layer and a second metal layer where the first and second metal layers have a relative thickness and collectively have a selected volume to provide an intermetallic metal after heat processing having a desired stoichiometric ratio of elements and a desired lamina thickness." Support for this amendment can be found in Example 3, for instance, of the present application. Judicious selection of the metal composition of the individual metal layers, the collective thickness of these metal layers, and the total volume of the lamina comprising such metal layers can be important to provide a final device having a desired intermetallic material in a lamine of predetermined, and potentially critical, thickness. For example, undesirable voids form during processing of pure metals into intermetallics as a result of Kirkendall porosities. See, for example, page 33, beginning at line 15, of the present application for a discussion of these issues.

These features are not taught or suggested by Paul 2, nor assignee's prior patent No. 6,672,502. Accordingly, applicants request that the rejection of independent claim 31 as allegedly being anticipated by Paul 2 be withdrawn.

Applicants also have cancelled claim 33 without prejudice

Remaining dependent claims 32 34-37, 39-40 and 43-45 are allowable over Paul 2 for the same reasons as stated for independent claim 31, and further in view of the patentable combinations of features recited in these dependent claims.

V. Rejection of Claim 3 for Obviousness

Claim 3 is rejected as allegedly being obvious over Paul 2 in view of U.S. patent No. 6,338,785. Applicants traverse this rejection and request that it be withdrawn.

Claim 3 depends from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 are not taught or suggested by the cited references. As a result, the combination of features of dependent claim 3 is not taught or suggested by the cited references, and hence the rejection of claim 3 for obviousness should be withdrawn.

VI. Rejection of Claims 5 and 8 for Obviousness

Claims 5 and 8 are rejected as allegedly being obvious over Paul 2 in view of U.S. patent No. 5,564,620. Applicants traverse this rejection and request that it be withdrawn. Applicants have canceled claim 8 without prejudice.

Claim 5 depends from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 is not taught or suggested by the cited references. As a result, the combination of features of dependent claim 5 is not taught or suggested by the cited references, and hence the rejection of claim 5 for obviousness should be withdrawn.

VII. Rejection of Claims 6 and 7 for Obviousness

Claims 6 and 7 are rejected as allegedly being obvious over Paul 2 in view of U.S. patent No. 5,564,620 and U.S. Patent No. 5,545,373. Applicants traverse this rejection and request that it be withdrawn.

Claims 6 and 7 depend from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 is not taught or suggested by the cited references. As a result, the combination of features of dependent claims 6 and 7 is not taught or suggested by the cited references, and hence the rejection of claims 6 and 7 for obviousness should be withdrawn.

VIII. Rejection of Claims 9 and 10 for Obviousness

Claims 9 and 10 are rejected as allegedly being obvious over Paul 2 in view of U.S. patent No. 5,564,620 and U.S. Patent No. 4,838,337. Applicants traverse this rejection and request that it be withdrawn.

Claims 9 and 10 depend from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 are not taught or suggested by the cited references. As a result, the combination of features of dependent claims 9 and 10 is not taught or suggested by the cited references, and hence the rejection of claims 9 and 10 for obviousness should be withdrawn.

IX. Rejection of Claims 11-13 for Obviousness

Claims 11-13 are rejected as allegedly being obvious over Paul 2 in view Duszczyc et al. Applicants traverse this rejection and request that it be withdrawn.

Claims 11-13 depend from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer

and an adjacent layer. Moreover, applicants disagree that the selecting both the metal layer thickness and the total volume of plural metal layers to provide both the stoichiometric ratio and lamina thickness to provide a desired result are obvious routine variables. For example, addressing the effects of microvoids and fin warpage as discussed in the present application were not predictable in view of the prior art.

The combination of features of independent claim 1 are not taught or suggested by the cited references. As a result, the combination of features of dependent claims 9 11-13 is not taught or suggested by the cited references, and hence the rejection of claims 11-13 for obviousness should be withdrawn.

X. Rejection of Claims 16-21, 24-27 and 38 for Obviousness

Claims 16-21, 24-27 and 38 are rejected as allegedly being obvious over Paul 1 and Paul 2. Applicants traverse this rejection and request that it be withdrawn.

Claims 16-21, 24-27 depend from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 are not taught or suggested by the cited references. As a result, the combination of features of dependent claims 16-21, 24-27 is not taught or suggested by the cited references, and hence the rejection of claims 16-21, 24-27 for obviousness should be withdrawn.

Claim 38 depends from independent claim 31. Applicants have amended independent claim 31 to state that "at least one lamina of the plurality of stacked and registered laminae comprises at least a first metal layer and a second metal layer where the first and second metal layers have a relative thickness and collectively have a selected volume to provide an intermetallic metal after heat processing having a desired stoichiometric ratio of elements and a desired lamina thickness" as discussed above. These features are not taught or suggested by either Paul 1 or Paul 2. Accordingly, applicants request that the rejection of dependent claim 38 be withdrawn.

XI. Rejection of Claim 22 for Obviousness

Claim 22 is rejected as allegedly being obvious over Paul 1, Paul 2 and U.S. Patent No. 5,564,620. Applicants traverse this rejection and request that it be withdrawn.

Claim 22 depends from independent claim 1. Applicants have amended claim 1 to recite that the process is applicable to nickel aluminides, iron aluminides and titanium aluminides, and further that the stack includes a bonding lamina between an intermetallic layer and an adjacent layer. The combination of features of independent claim 1 are not taught or suggested by the cited references. As a result, the combination of features of dependent claim 22 is not taught or suggested by the cited references, and hence the rejection of claim 22 for obviousness should be withdrawn.

XII. Rejection of Claims 41 and 42 for Obviousness

Claims 41-42 are rejected as allegedly being obvious over Paul 2 in view of U.S. patent No. 5,564,620. Applicants traverse this rejection and request that it be withdrawn.

Claims 41-42 depend from independent claim 31. Applicants have amended independent claim 31 to state that "at least one lamina of the plurality of stacked and registered laminae comprises at least a first metal layer and a second metal layer where the first and second metal layers have a relative thickness and collectively have a selected volume to provide an intermetallic metal after heat processing having a desired stoichiometric ratio of elements and a desired lamina thickness" as discussed above. These features are not taught or suggested by either Paul 1 or Paul 2. Accordingly, applicants request that the rejection of dependent claim 41-42 be withdrawn.

XIII. New Claims 46 and 47

Applicants have added two new claims to this application. Dependent claim 46 depends from independent claim 31 and states that the process further comprises ordering metal layers in a predetermined order selected to minimize voids during heat processing that result from Kirkendall porosities. Support for this claim can be found at, for example, page 33, beginning at line 15. The combination of features of independent claim 1 and the feature of dependent claim

46 concerning minimizing voids produced during heat processing is neither anticipated by nor obvious in view of the references cited against this application.

Applicants also have added new independent claim 47 directed to a method for making a device having an intermetallic. Independent claim 47 combines the concepts of both using a machinable intermetallic lamina, and forming a second intermetallic lamina by heating processing. These concepts were separately recited in claims as initially filed in the application.

The present application is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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